RESEARCH AND DEVELOPMENT, NEUCHATEL - QUARTERLY REPORT

DIVISION : RESEARCH

SUBJECT TITLE : SS-DETERMINATION

PERIOD COVERED : April - June 1990

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OBJECTIVES

To investigate the formation mechanism of SS parameters and to measure SS yields.
To develop analytical methods for SS parameters and to improve actual ones.

RESULTS

Method development (projects ATLAS, NEPTUNE)

- Determination of SS ozone (ATLAS)

  In order to confirm that the ozone analyser measures ozone in SS and not other compounds that interfere with the measurement, SS was sampled with Dräger tubes. Ozone could not be detected and its concentration should therefore be below 50 ppb for three cigarettes, if present.
  To investigate if the reading of the ozone analyser is influenced by SS particles, different filter materials with pore sizes from 5 um (original filter) to 0.2 um were used. It was shown that filters made of teflon or polyvinylidene difluoride do not react with ozone, and that the smaller the pore size, the lower the ozone instrument reading. At a pore size of 0.22 um, where no further interference of particles is expected, the instrument reading was still ~ 70 ppb for 3 cigarettes, and above the detection limit of the Dräger tubes (50 ppb). However, ozone was not detected. Therefore, the possible interference of the following SS components on the measurement was investigated : NO, NO_2, CO, CO_2, benzene, water, formaldehyde, acetaldehyde and isoprene. No influence of these compounds on the O_3 instrument reading, either with or without smoke was observed.
  Using an impinger containing water or an Extrelut tube coated with water at the inlet of the O_3 analyses, and sampling SS through them, a zero reading was obtained which shows, instead of ozone, a compound which is either soluble in

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water or decomposed by water.

Status
Smoking 3 cigarettes, no ozone was detected in SS using Dräger tubes. If ozone is present in SS, its concentration is smaller than 15 ppb per cigarette.
When excluding particles from SS, the analyser reading is 20 ppb per cigarette. This value is probably not due to ozone and the common SS parameters.

Plans
The effect of ozone on SS and on the instrument reading will be further investigated.

- Determination of SS gas-phase hydrocarbon (NEPTUNE)

Prototypes of projects CALYPSO (various cigarette wrappers) and TRITON (single component cigarettes) were smoked in the experimental room in order to determine hydrocarbon concentrations. Only minor differences in hydrocarbon concentrations between all prototypes were observed. A correlation between gas phase and particle phase was not found.

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